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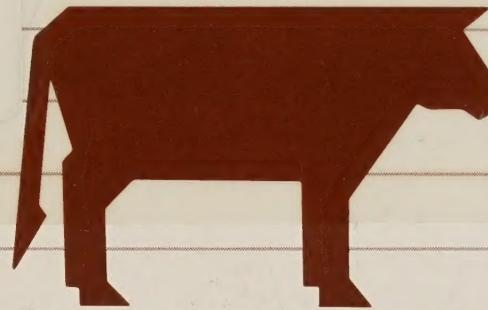
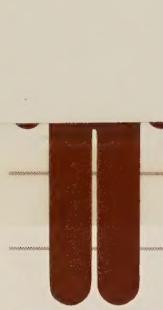
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# All About the Agricultural Research Service

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## All About the Agricultural Research Service

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The Agricultural Research Service is the principal scientific research agency of the U.S. Department of Agriculture. Our facilities—at about 130 locations—are situated strategically across the major farm and rangeland ecosystems and climatic zones of the United States. Consequently, ARS has the ability to bring research expertise to bear on the same national problem in several different geographic locations.

Over 7,700 people are employed by ARS on a full-time basis. One-third of these employees are scientists and engineers; the other two-thirds are research technicians and other support staff. The current operating budget for ARS is nearly half a billion dollars. The appropriation has remained relatively level in terms of constant dollars over the past decade.

Agricultural research more than pays for itself. Almost every estimate made of the rate of return to investment in agricultural research over the past three decades is between 35 and 45 percent a year. Analysis of the agricultural production figures for the last five years shows a rate of return on investment higher than 45 percent. It is hard to imagine any investment in either the private or public sector that would consistently produce more favorable rates of return.

One discovery alone, a vaccine against Marek's disease, has saved the U.S. poultry industry an estimated two billion dollars since its release in 1971.

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### Contributions of Agricultural Research

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One important goal of agricultural research is greater production efficiency that lowers the cost of production and increases the return on investment received by farmers and ranchers for their products. By pursuing this and related goals, the Agricultural Research Service has made a major contribution to the unparalleled standard of living enjoyed by the American people.

Technological developments—the products of scientific research—have enabled the Nation's farmers to:

- Increase livestock production and yields for every major crop;
- Improve productivity of most farmlands;
- Overcome food and fiber losses caused by disease and insects;
- Grow crops in areas once barren;
- Use more efficient equipment; and
- Protect soil and water resources.



Researchers use genetic engineering to develop higher yielding, disease-resistant crops.

The Nation's consumers are the ultimate beneficiaries of investments in agricultural research. Year round, they have reliable and economical supplies of fresh and processed foods of superior quality and wholesomeness. They pay less of their disposable income for food than do consumers in any other nation. The Agricultural Research Service is an integral part of the total U.S. agricultural research system—Federal, State, and private sector—that enables farmers to set and maintain such records.



Twin calves are the result of embryo manipulation in which ovum from a cow is divided and transferred to the uterus of a surrogate cow.

### **Commitment to Science**

A large part of the research conducted by ARS is fundamental, attacking problems that require long-term, high-risk research approaches. ARS researchers employ the most advanced technologies used by scientists anywhere. A growing proportion of this research falls under the broad heading of biotechnology.

Practically every aspect of agricultural research is pursued at the larger ARS locations, which include major research centers such as Beltsville, MD; and regional centers at New Orleans, LA; Peoria, IL; Albany, CA, and Philadelphia, PA. In many instances, ARS carries out research in cooperative partnership with land-grant universities and with State agricultural experiment stations.

The largest and most diverse ARS installation is the Beltsville Agricultural Research Center, which covers more than 7,000 acres near Washington, DC. Some 2,500 USDA employees work at the Center in research laboratories, greenhouses, barns, poultry houses, shops, and offices.



Scientists at the Plum Island Animal Disease Center, off Long Island, NY, developed the first vaccine to protect livestock against a specific strain of foot-and-mouth disease virus.

### **What's Happening Now**

For many crops and commodities, the once rapid increase in yields has slowed in recent years. Most scientists believe this is a temporary condition; finding ways to revitalize the growth rate is a major concern of the Agricultural Research Service. Here are some of the new developments in biology and chemistry that show promise for improving agricultural productivity in the years immediately ahead.

- Chemical growth regulators that result in larger vegetable yields and earlier harvests.
- New crop varieties that are more resistant to insects, nematodes, disease, and stress, and that produce larger yields.
- Embryos and fertilized eggs that can be transplanted from cows of superior genetic quality to surrogate mothers.
- Low-cost procedures for engineering the genes of eggs and transferring these eggs into surrogate mothers to obtain genetically engineered offspring.



Overcome by the world's first viral insecticide, a dead *Heliothis* caterpillar, a serious pest of many crops, releases billions of virus particles that spread to protect other plants. Environmentally safe, the virus leaves beneficial insects unharmed.

- Techniques for altering the sex ratios in animal offspring, breeding males or females as desired.
- Dwarf fruit trees that produce higher per-acre yields and are easier to harvest.
- Through molecular biology, new vaccines to prevent diseases in animals and poultry, such as a recent inoculation to curb foot-and-mouth disease in livestock.
- Chemicals from insects, plants, and other natural sources which control or disrupt the growth and reproduction of insects.
- Fundamental research on the nitrogen cycle in soils, including nitrogen fixation and impacts of soil moisture and tillage practices.
- New rice plants, developed through tissue culture, with more and better quality protein.
- Through transfer of genes, new ways to incorporate characteristics that enhance a plant's value as a source of nutrients or natural fibers.
- Many new food or industrial products derived from plants or animals that increase the value of agricultural commodities.





Manmade rainstorms help scientists and engineers evaluate how effectively crop residues curb soil erosion.

### A Strategy for the Future

A scientific/technological revolution for agriculture is in the making. The potential is great for major scientific breakthroughs in the agricultural sciences.

To realize this potential, the Agricultural Research Service has developed a strategy to guide the Agency into the next century and beyond. This Strategic Plan identifies and explains the main problems that confront the food and agricultural industry and charts the minimum courses of action that will provide the research needed for solutions.

The six objectives of the Strategic Plan are to:

- Manage and conserve the Nation's soil and water resources for a stable and productive agriculture;
- Maintain and increase the productivity and quality of crop plants;
- Increase the productivity of animals and the quality of animal products;



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- Improve the system for delivery and conversion of raw agricultural commodities into food and useful products for domestic consumption and export;
- Promote optimum human health and performance through improved nutrition; and
- Integrate scientific knowledge on agricultural production and processing into systems that optimize resource management and facilitate the transfer of technology to end-users.

These six objectives describe the *aim* of ARS science. Each objective proposes to "develop the means to" address a specific problem area. The Agricultural Research Service is a research agency; farmers and ranchers, action agencies, and business and industry must apply the research if the objectives are to be achieved.

